Progressive respiratory failure: a rare complication after graded talc pleurodesis

Introduction

A 53-year-old woman with metastatic breast cancer underwent video-assisted thoracoscopic surgery and talc pleurodesis for recurrent right-sided symptomatic malignant pleural effusion. Over 4 years she developed chronic and progressive respiratory failure requiring non-invasive ventilation. Her pulmonary function declined and serial computed tomography demonstrated progressive unilateral interstitial change and volume loss of the right hemithorax.

Discussion

Pleural effusions secondary to metastatic malignancy can cause breathlessness and impair quality of life. Once drained, use of talc, composed of hydrated magnesium silicate, adheres the visceral and parietal pleura preventing fluid re-accumulation, with a success rate of around 78% (Dresler et al, 2005).

Mineral talc particles are not uniform in size and preparations are classified as either ungraded (no selection of particle size), or graded (particulates are size-calibrated). Talc pleurodesis may cause pneumonitis and acute respiratory distress syndrome. This appears to be size-dependent, with particles less than 15 microns in size causing greater increases in A-a gradient and systemic inflammation than graded talc (50% of particles >25 microns)(Maskell et al, 2004).

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Extra-pulmonary deposition has also been described in the brain, liver, kidney, heart and skeletal muscle (Campos et al, 1997). One international, multicentre prospective cohort study of 558 patients showed no occurrences of acute respiratory distress syndrome post-pleurodesis with large-particle talc (Janssen et al, 2007) with complications arising from the sclerosing process, including chest pain, fever, empyema, re-inflation, pulmonary oedema and pneumonia (Barbetakis et al, 2010).

CASE REPORT

A 53-year-old woman with a background of metastatic breast cancer attended chest clinic with a history of worsening breathlessness secondary to a recurrent right-sided malignant pleural effusion. Her treatment for breast cancer 14 years earlier had included wide local excision followed by a course of postoperative radiotherapy to the right breast and combination chemotherapy. She was a never-smoker with no past history of respiratory disease. She underwent video-assisted thoracoscopic surgery and talc pleurodesis in October 2011. The procedure was uncomplicated with the successful insufflation of 6 g of graded SteriTalc F4® by Novatech. Postoperatively she made a good recovery although she developed a persistent sinus tachycardia with no clear underlying cause.

In the months following surgery she became increasingly unwell with lethargy, weight loss and worsening shortness of breath. Her deterioration at home culminated in a presentation 7 months later with type 2 respiratory failure requiring admission to intensive care for intubation and ventilation. Computed tomography of the chest demonstrated new patches of consolidation in the right upper lobe. She suffered a protracted admission requiring tracheostomy and long respiratory wean. She was eventually discharged with nocturnal non-invasive ventilation. She underwent a trial of steroid treatment, which resulted in drug-induced psychosis. Her dose of steroid was subsequently tapered down but made very little difference to her symptoms and lung function.

Despite recovery from her acute admission, over the next 2 years her respiratory function declined (*Figure 1*). Her functional status deteriorated dramatically and she became wheelchair-bound.

As well as the decline in lung function, the initial consolidation transformed to interstitial fibrosis with marked loss of volume in the right hemithorax (*Figure 2*).

Her non-invasive ventilation was adjusted over time, and this enabled the patient to retain her independence for as long as possible. Her resting tachycardia persisted throughout and was managed with ivabradine. She suffered frequent admissions requiring increasing pressure support and was at maximal support towards the end of her life. Her ER positive, HER-2 negative breast carcinoma was managed with fulvestrant from 2011 to 2014. She was subsequently switched to megestrol acetate with two cycles of palliative capecitabine in 2014. Although malignancy certainly played a significant role in her general decline, physical deconditioning and weakness, her respiratory failure became difficult to manage. She was unable to cope without non-invasive ventilation. She was cared for in the hospice where she made a conscious decision to stop non-invasive ventilation. She died from respiratory failure in 2015.

The aetiology of her progressive interstitial lung disease was debated during her medical care but given the asymmetry and temporal relationship to talc administration, pulmonary talcosis was deemed the likeliest cause. Her disease followed a chronic progressive course refractory to steroids. This diagnosis is supported by a post-mortem which only demonstrated pleural fibrotic change with markedly reduced lung volumes. There was no evidence of malignant infiltration in the pleural space to explain thoracic restriction and volume loss. Given the uncomplicated surgical procedure the authors postulate that her tachycardia may have been secondary to talc-induced vagal nerve injury – however, they are unable to prove this.

Figure 1. Serial spirometry results. Spirometry revealed a dramatic decline in vital capacity following pleurodesis.

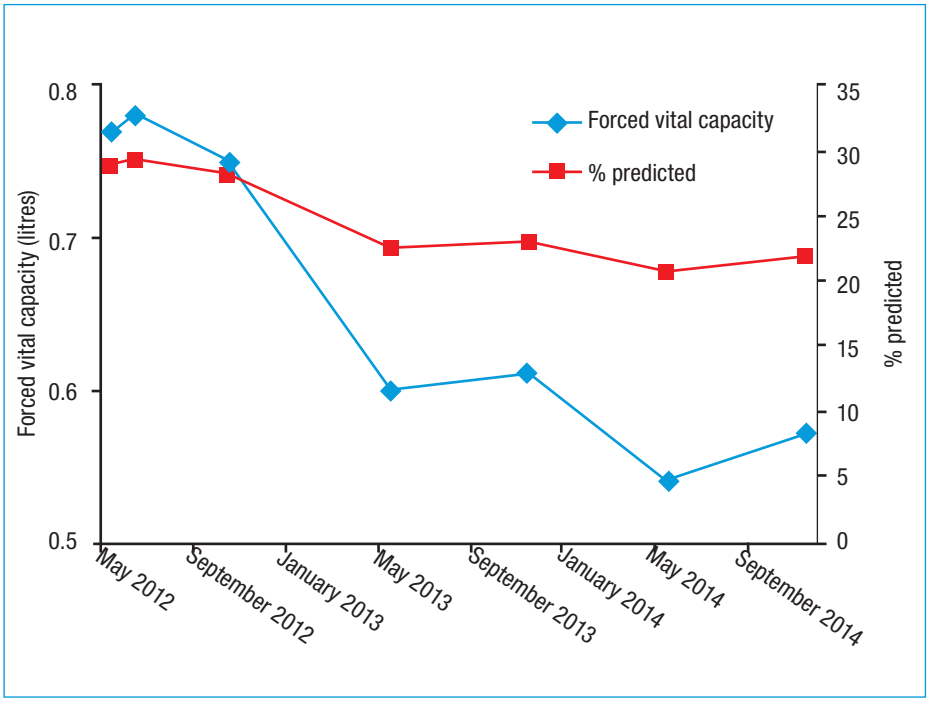
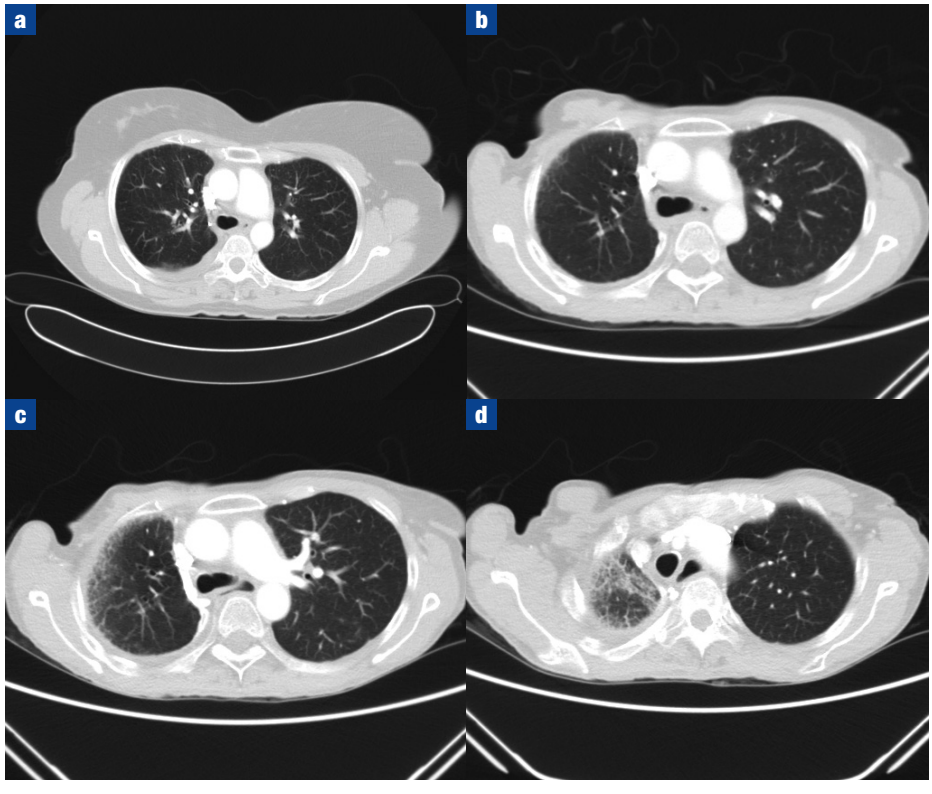


Figure 2. Serial chest imaging. Axial computed tomography images of the chest. Progression of the unilateral subpleural fibrotic changes is most evident at the periphery and apex of the right lung. **a.** February 2011. **b.** September 2013. **c** and **d.** October 2014.



To the authors' knowledge, this is the second case of talcosis resulting from pleurodesis with graded talc. The temporal association of post-video-assisted thoracoscopic surgery respiratory failure together with progressive unilateral pulmonary fibrosis and severe restrictive lung disease, which was not apparent preoperatively, is similar to one other case report in which 10–30 micron talc was used (Griffo et al, 2009).

This patient's post-mortem findings and 4 years of survival from first presentation with respiratory failure to death rules out lymphangitis carcinomatosis and metastatic pleural disease as a cause of her death. The absence of disease on pre-pleurodesis computed tomography scans also supports these conclusions. There was certainly no exposure to occupational or environmental agents that may predispose to interstitial lung disease. Although an idiopathic interstitial pneumonia was considered (hence the trial of steroid) these are rarely unilateral. **BJHM**

LEARNING POINTS

- The clinician and patient should be aware of the potential complications of talc pleurodesis.
- Some of these patients can be managed with non-invasive ventilation with close monitoring.
- Pulmonary talcosis is a rare but potentially fatal consequence of talc pleurodesis.

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